

in secondary forests, verges, clearings, scattered woodlands and plantations. They are not birds of the primary forest interior (Thiollay and Meyburg 1988). They perch in tall trees using them as lookouts to scan for prey, reportedly jungle fowl, peafowl, partridges, hares, rodents, snakes and lizards. I observed a hawk-eagle preying on a field or bush rat in the late afternoon. On another occasion, I observed for close to an hour a hawk-eagle feeding on an unidentified prey.

Predation rates have been reported higher close to the forest edge, suggesting that predation rate was high due to predators living in the surrounding habitat and penetrating the forest fragments (Wilcove 1985, Wilcove *et al.* 1986). The relative abundance of raptorial species was found to increase in disturbed and logged forests (Johns 1983).

The general behaviour pattern observed in all focal squirrels, and incidentally in other non-focal squirrels entering the nest in the daytime to rest for long periods, may constitute a local adaptation to a more disturbed, open canopy habitat, where avian predator density, activity and predation attempts seem high.

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4. REDISCOVERY OF THE AFGHAN MOLE VOLE *ELLOBIUS FUSCOCAPILLUS* IN PAKISTAN

(With one plate)

Rodents which spend most of their lives underground are hard to catch or trap, and hence are poorly represented in the world's major museum reference collections.

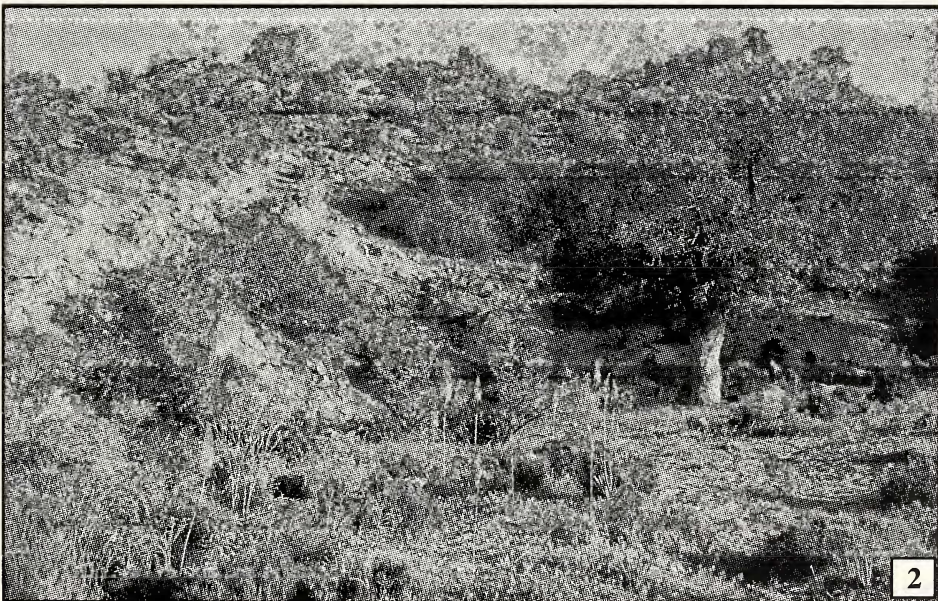


Fig. 1: *Ellobius fuscocapillus* showing incisor teeth; Fig. 2: Habitat of *Ellobius fuscocapillus* showing foxtail lilies and mountain ash *Fraxinus xanthoxiloides*

Whilst studying the mammals of Pakistan in the 1970's, I examined specimens available in the British Museum of Natural History, the Smithsonian Natural History Museum in Washington, and the extensive collection belonging to the Bombay Natural History Society, which has received contributions from all over the Subcontinent. The Smithsonian possessed a good series of the Afghan mole vole (*Ellobius fuscocapillus*) from northern parts of Iran, but none from Pakistan, or elsewhere, despite extensive mammal collecting in the province of Baluchistan during the 1960's by the University of Maryland, and later by the Chicago Field Museum in neighbouring Afghanistan. The British Museum possessed only two specimens from Pakistan, and one from Afghanistan, both Pakistani specimens collected at the turn of the century, from Mach in the centre of the province (29° 52' N, 67° 20' E). There were no specimens in the Bombay Natural History Society collection.

In the late 1960s and throughout the 1970s I made mammal trapping surveys in most parts of Baluchistan. My associates working for the FAO sponsored Vertebrate Pest Control Centre (of which I was then Project Manager) under the National Agricultural Research Council of Pakistan, also searched around Mach, only encountering the short tailed mole rat (*Nesokia indica*), so that I concluded (Roberts 1977) that this larger and highly aggressive burrowing rodent had possibly driven the Afghan Mole Vole, at best a relict population in Pakistan, to local extinction.

In 1995 my friend S. Raza Abbas, a professional wildlife photographer was perched on a precipitous mountain ridge in the Torghar Range of Zhob dist. in northwestern Baluchistan, filming straight-horned markhor (*Capra falconeri jerdoni*). Something moving by his feet caught his eye — it was a very active, small, furry creature which seemed to ignore human presence, and was busily searching for green food. Raza Abbas filmed it eating green leaves

and moving extensively over very steep shaley ground. Some two years later, this film was shown to Dr Charles Wood of Florida Museum and subsequently to me — both of us recognised it with excitement as the long lost Afghan mole vole — excitement because it was discovered nearly 322 km northwest of the Mach (at 31° 20' N, 68° 27' E), at a much higher elevation (2650 m) and in a region which experiences winter temperatures down to -16°C. The literature, mostly from Russian sources, described this vole as inhabiting rolling hilly country and preferring valley floors with a good covering of soil. In the former Soviet Union, it only occurs in southern Turkmenistan along the border with northeastern Afghanistan (Bobrinskii *et al.* 1965).

In late April this year, I had the privilege of camping in the Torghar Nature Reserve, in Zhob dist., Baluchistan, at the invitation of Sirdar Naseer Tareen, a local tribal leader who is a dedicated conservationist and who through patience and persistence has encouraged the local tribesmen to create this Sanctuary, successfully controlling over-grazing and banning all hunting. (Sadly, such success stories are exceptional in Pakistan today). From this experience, I would like to add to what is known about this enigmatic little vole. The habitat can be described as arid mountain steppe country, with light snowfall in winter not exceeding 45 cm. Torghar consists of jagged wind-eroded sandstone and mudstone ranges, extending roughly east-west for approximately 96 km with rainfall rarely exceeding 101-121 mm per annum.

The region is characterised by much endemism in plants, and in spring is decorated with stretches of bright flowering plants, including many bulbous lilies, tulips and wild onions. These succulent bulbs form the main diet of the Afghan mole vole, principally the golden foxtail lily, *Eremurus stenophyllus*, the Persian foxtail lily *Eremurus persicus*, pink or yellow *Tulipa stellata*, and several species of *Allium*.

The dominant trees are stunted xerophytic *Pistachio cabulica* and *Fraxinus xanthoxiloides*, interspersed with bushes of *Berberis balochistanica* and *Astragalus psilocentris*.

Evidence obtained over five nights, from recently excavated mounds of earth, indicated that the mole vole was relatively widespread and common in this area, from 1,800 - 2,600 m. A mature specimen is quite large for a vole, measuring 140 mm in head and body length, with a very short, hair-covered tail 11-15 mm in length, tiny eyes, a blunt upturned muzzle, and very prominent pro-odont incisors, pinkish white in colour and bearing longitudinal grooves. The body fur is velvety and thick, enabling the animal to reverse inside its burrow when necessary. The tiny ears are hairless and hidden in the body fur (2-5 mm in length). Its scientific name (*fuscocapillus*) indicates that the hair of its head is blackish, but the body fur can be quite variable in colour, generally quite dark in winter, changing to reddish or cinnamon brown in summer, but with most of the head blackish and the cheeks paler reddish brown. The belly fur is greyish white, and the forefeet, considering its burrowing habits are not particularly strong or well developed.

Captured animals, as well as free ranging ones, often showed no inclination to burrow, and Lay (1967) describes one in Iran which swam strongly across a 9 m wide stream, and another which travelled 300 m, and remained one hour above ground before commencing to burrow. Their eyesight is, however, very poor as indicated by the one which nearly bumped into Raza Abbas, and also by their frequent falling off the edge of eroded ground whilst travelling on the surface. Their burrowing technique is not entirely typical of other fossorial rodents, in that they use mostly their protruding incisors to dig soil, only occasionally pushing it backwards with the forefeet, and eventually moving their whole body backwards, using their spade shaped hind feet to push soil into surface mounds. After admiring the speed with which this vole could burrow in such dry stony ground, I would like

to "christen" it "Fossorulus" (Latin = Little Digger). When its jaws are open the fur covered lips are seen to extend around and behind the incisors down to a relatively small round mouth opening. Such an arrangement enables them to dig and to forage, without swallowing any soil. Films made by S. Raza Abbas and Sirdar Tareen show the area with plenty of small predators, including the stone marten (*Martes foina*), the elusive spotted steppe cat (*Felis sylvestris ornata*), hill foxes (*Vulpes vulpes griffithi*), rat snake (*Ptyas mucosus*), and such diurnal birds of prey as the booted eagle (*Hieraaetus pennatus*), and both the long legged (*Buteo rufinus*) and common buzzard (*Buteo buteo japonicus*). The Afghan mole vole must at times fall prey to all these, but it does not hibernate in winter and can breed at all times of the year (Nowak 1991), and so can reproduce fairly rapidly. Grzimek (1975) states that they reach sexual maturity at 90 days and that the young are fairly slow growing, remaining in the underground nest for upto 8 weeks.

On April 28, 1998, at an elevation of 2285 m, with the help of the local tribesmen I obtained an immature female (head and body length 123 mm), with a litter of three young estimated as one month old. These were light silvery grey in colour with black face masks, quite unlike their cinnamon brown mother. The nest was a surprisingly bulky affair made of chewed herb and grass fibres, and measuring about 220 cm in diameter. Tunnels radiated from this nest.

This vole has an ability to reconnoitre new territory and to travel extensively above ground, frequently in bright sunlight and over very steep gradients. In Torghar there is only sparse vegetative cover with much bare ground intervening, and being dependent mostly on underground tubers, this vole must soon exhaust accessible food supply and seek fresh ground in which to burrow. The much more widely spread short tailed mole vole (*Nesokia indica*), in Baluchistan is confined to areas with some grass cover. Our radio telemetry studies in Sind (Fulk,

Smiet, and Khokhar 1981), revealed that *Nesokia* spends prolonged periods underground, surfacing only occasionally, invariably in darkness. Its principal food, we found, was rhizomes of grasses and succulent roots. It is, therefore, not an ecological competitor with

Ellobius in arid mountainous tracts.

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5. *MENOPON GALLINAE* INFESTING GREATER ADJUTANT STORK *LEPTOPTILOS DUBIUS* AT NAGAON, ASSAM

Numerous reports on the occurrence of the poultry louse *Menopon gallinae* on poultry and wild birds are available (Soulsby 1968) but there appears to be no report on the occurrence of *M. gallinae* on the greater adjutant stork *Leptoptilos dubius* (Gmelin). The greater adjutant stork is the most endangered species of stork in the world (Rahmani *et. al.* 1990). Only a small viable population is surviving in the Brahmaputra valley, Assam (Saikia and Bhattacharjee 1989). These storks are mainly scavengers, but during the breeding season they prey on living creatures. In the non-breeding season, they are found at garbage dumps in some towns of Assam. At such foraging sites they can be seen with vultures *Gyps* spp., black kites *Milvus migrans*, crows *Corvus* spp. and other scavengers. The garbage generally contains inedible parts of slaughtered animals, which are readily eaten up by adjutant storks.

In 1995 in Nagaon, a juvenile greater adjutant stork was observed sitting continuously on a mound in a shallow river for more than 24 hours. It was too weak to walk and fell down

frequently when it tried to walk. We brought it to our field laboratory for study and to render first aid.

The bird was seen to be heavily infested with tiny, flat, mobile, wingless arthropods. They were removed with a soft brush and preserved in glass vials for identification. They were cleared in 10% KOH solution, fixed in 10% formalin and permanent slides were prepared. At the College of Veterinary Science, Assam Agricultural University, Guwahati, they were identified as the common poultry louse *Menopon gallinae*.

The infested bird was treated first with a repellent extract of deodar and vegetable oils. Later, it was treated with Carbaryl Dust Notix (Carbaryl 5%, Inerts q.s.). Within ten days, the lice had almost disappeared.

After we gave it medicine for liver disease and drops of astozyme, it recovered quickly and became a voracious feeder. Soon it could stand on its feet, and on the third day it had almost recovered. We kept it for two months under observation and then released it into the wild.